NOTICE

All drawings located at the end of the document.

2003 McKay Ditch Bypass Extension Project Preble's Mouse Mitigation Monitoring Report for RFETS

Introduction

In 1999, a bypass extension pipeline was installed in the Walnut Creek drainage to prevent City of Broomfield water in the McKay Ditch from co-mingling with water released from the Industrial Area at the Rocky Flats Environmental Technology Site (Site) in Walnut Creek. Because portions of the project impacted the Preble's meadow jumping mouse (Preble's mouse; *Zapus hudsonius preblei*), a Biological Assessment was written for the project. The USFWS issued a Biological Opinion on February 11, 1999 that stipulated vegetation monitoring and written reporting requirements for the mitigation plantings that were done as part of the mitigation for impacts to the Preble's mouse. This report summarizes the results of the 2001, 2002, and 2003 vegetation monitoring conducted as required by the Biological Opinion issued by the U.S. Fish and Wildlife Service (USFWS). Based on conversations with Beth Dickerson of the USFWS (April 3, 2003) this report serves as the final monitoring report required by the Biological Opinioni.

Methods

Two separate shrub plantings were done to meet mitigation requirements. The native shrubs, choke cherry (*Prunus virginiana*), snowberry (*Symphoricarpos occidentalis*), Arkansas rose (*Rosa arkansana*), Wood's rose (*Rosa woodsii*), and coyote willow (*Salix exigua*) were used in the plantings. In fall 1999, 707 choke cherry, snowberry, Arkansas rose, and coyote willow were planted on both sides of the stream, upstream and downstream from the diversion structure in Walnut Creek (Figure 1). Plantings were installed in clumps or clusters of 10-20 plants to begin to establish patches of these species to increase the structural diversity of the habitat along the stream. In late summer 2000, 685 choke cherry, snowberry, Wood's rose, and coyote willow shrubs were added along the south side of the stream from the diversion structure area to the confluence with the main channel of Walnut Creek (Figure 1). Maintenance of the plantings has consisted of occasional watering conducted throughout the growing season from the time of installation through late summer 2002. Watering was especially important in 2002 due to the drought conditions the Site experienced. No water was applied during 2003.

Monitoring of the mitigation plantings consisted of counting the number of individuals and clumps of plants installed in 1999 and 2000 and returning to count surviving plants and clumps in 2001, 2002, and 2003. Counts for surviving plants were done in mid to late summer. Plants were considered living if they had any green leaves present. In addition, photographs were taken to document the changes in habitat structure along the stream.

Results and Discussion

Table 1 lists the species and number of individual plants and clumps of plants that were installed in both 1999 and 2000, as well as the numbers surviving in 2001, 2002, and 2003. A total of 707 shrubs were installed in 1999, with an additional 685 planted in 2000. Coyote willow was the most planted species, followed by the rose species, snowberry, and choke cherry.

Results after four years for the 1999 planting show good survivability of snowberry, Arkansas rose, and choke cherry (Table 1). All of the planted choke cherry (100%) have established and survived through 2003, four years after planting. Data for snowberry and Arkansas rose showed 90 percent and 78 percent survival of these species through 2001. In 2002 and 2003, however, counts of individual plants of snowberry and Arkansas rose were not possible because the individuals in each patch had coalesced into a single clump of plants. So it was no longer possible to count the original number of installed plants. Counted as clumps, survival for snowberry, Arkansas rose, and chokecherry, is 100 percent in 2003 for the 1999 planting. For snowberry and Arkansas rose, the clumps have become nearly solid stands of the species in most patches. The snowberry patch in Figure 2 illustrates how the snowberry plants have filled

in the spaces where the individual plants were planted. The photograph was taken in late July 2003. Coyote willow is the only species with poor survivability. Only 34 percent of the plants (68 percent of the clumps) had survived through 2003. Much of the low survivability of the coyote willow is attributable to the placement of the plants too far from the stream edge where not enough water was available to support them.

Similar results were found for the 2000 planting, where snowberry, Wood's rose, choke cherry, did very well and most of the coyote willow died by 2002. Survival of snowberry and Wood's rose plants was 97 percent and 84 percent, respectively, through 2002. In 2003, however, counts of individual plants of snowberry and Wood's rose were not possible because most of the plants in a clump had coalesced into nearly solid stands. So only counts of surviving clumps were made for these species in 2003. For snowberry, Wood's rose, and choke cherry, 100 percent of the clumps have survived to 2003. Coyote willow survival in the 2000 planting is less than that from the 1999 planting. Only 14 percent of the individual 2000 coyote willow (32 percent of the clumps) were surviving by late summer 2003, compared to 34 percent (68 percent of the clumps) from the 1999 planting. Again much of this is attributable to the placement of the plants too far from the stream edge. However, the drought may have impacted the 2000 plants much greater than the 1999 planting, since most of the loss of coyote willow in the 2000 planting occurred in 2002 during the drought. Losses of coyote willow in the 1999 planting were not as dramatic in 2002 as compared to those seen in the 2000 planting. The extra year of growth for the 1999 plants may have allowed for greater development of a deeper root system that allowed many more of those coyote willow plants to survive the extreme drought conditions experienced in 2002. Figures 3 shows some of the 2000 plantings along Walnut Creek in 2003.

Over the past three years the City of Broomfield has run water down the ditch for approximately 1.5 months each year. In 2000, a total of 448 acre feet of water was run through the pipeline from June 13 to July 28. In 2001, a total of 721 acre feet of water was run through the pipeline from May 23 through July 11. In 2002, no water was run through the pipeline due to the drought conditions. In 2003, 581 acre feet of water was run through the pipeline from June 10 through July 12.

In general, the overall success of the mitigation plantings has been good. Although the coyote willow has not done well and should probably have not been used in this area, the other shrub species are surviving well and filling in the patches along the stream. Over time these shrub clumps should continue to expand and begin to coalesce into larger patches providing a greater vegetation structure and protection for the Preble's mouse. It is hoped that in time the increased vegetation structure will attract Preble's mice into this reach of the stream.

No success criteria were specified in the biological assessment or biological opinion. The biological opinion simply stated that, "monitoring would continue for at least two growing seasons (or until such time as DOE and the Service determine that restoration and enhancement have been successfully completed)." Monitoring has been conducted for four years now. Based on conversations and a site tour of the mitigation area with Beth Dickerson (April 3, 2003), it was agreed that the 2003 monitoring would be the last required for this mitigation planting. Given that 100 percent of the clumps of snowberry, chokecherry, Arkansas rose, and Wood's rose have survived past three or four years, these species are established and should continue to expand and fill in areas along the stream. The loss of most of the coyote willow is of little consequence at these locations, since it does not occur along the stream reach naturally and probably never should have been planted since there is apparently not enough water to support a substantial population of the species. Therefore we believe the shrub enhancement has been successful and should be able to sustain itself in the future.

Conclusions

Impacts to Preble's mouse habitat resulting from the McKay Ditch bypass project required migitation to offset losses. A total of 1392 shrubs of coyote willow, choke cherry, snowberry, Arkansas rose, and Wood's rose were planted along Walnut Creek in 1999 and 2000 to increase the structural diversity of the vegetation along the stream for the Preble's mouse. Monitoring consisted of survival counts of shrubs and photographs. Overall, the mitigation plantings have been successful. Snowberry, chokecherry, and the

rose species have survived and continue to do well. Coyote willow has largely failed due to the distance they were planted from the stream and the drought experienced in 2002. In time the snowberry, chokecherry, and the rose species should continue to fill in and expand from the original clumps in which they were planted. We believe the shrub enhancement planting to be successful and the increase in structural diversity and associated cover along the stream should provide suitable habitat for the Preble's mouse in the coming years.

Figure 2. Snowberry patch where individual shrubs have filled in the spaces between the original plants in the 1999 planting. New plants are starting to come up outside the original planting and in time will create a large patch of snowberry along the stream.

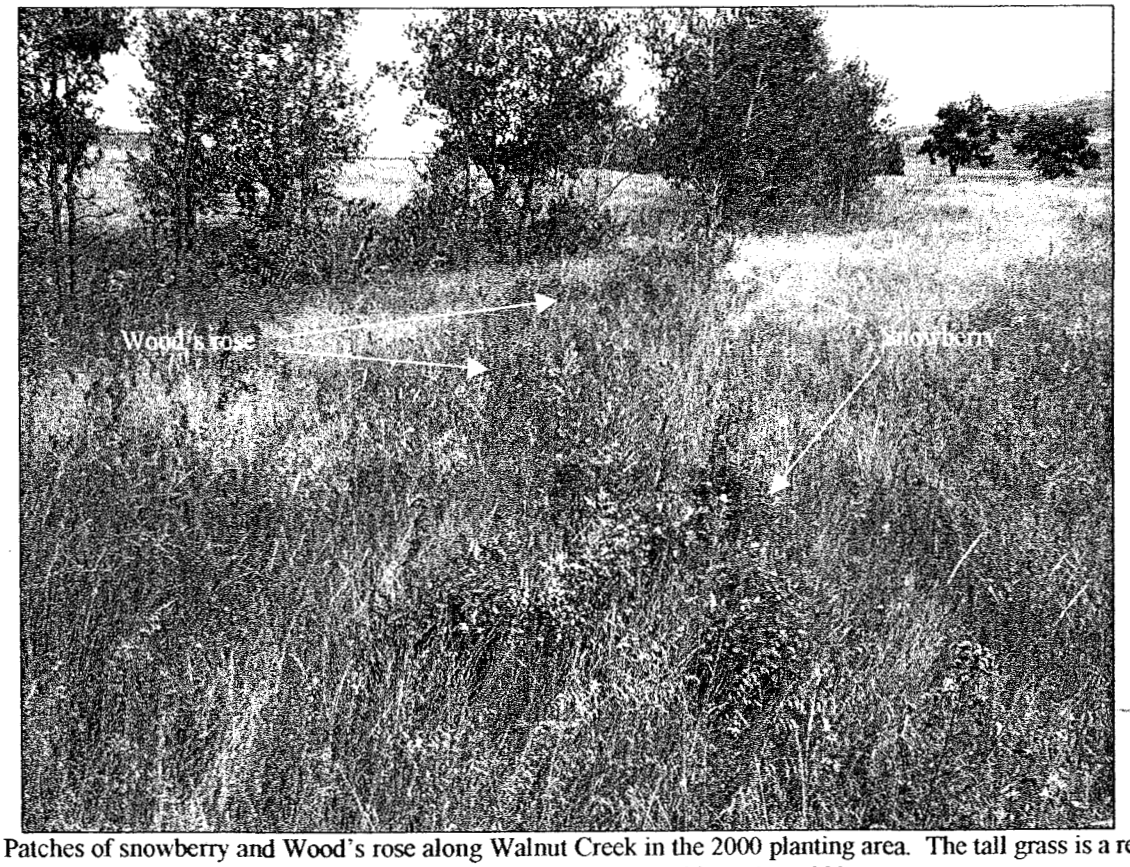

Figure 3. Patches of snowberry and Wood's rose along Walnut Creek in the 2000 planting area. The tall grass is a result of the early spring rains the Site experienced in spring 2003.

Table 1. McKay Ditch Shrub Planting Survival Rates

Individual Plant Survival

1999 Planting	# Individuals Planted	2001 Individuals Count	2002 Individuals Count	2003 Individuals Count	% Surviving
Symphoricarpos occidentalis	134	120	NA	NA	NA
Rosa arkansana	218	169	NA	NA	NA
Prunus virginiana	70	71	67	72	103
Salix exigua	285	189	104	97	34
Total	707	549	171	169	

2000 Planting	# Individuals Planted	2001 Individuals Count	2002 Individuals Count	2003 Individuals Count	% Surviving
Symphoricarpos occidentalis	162	164	157	NA	NA
Rosa woodsii	203	191	171	NA	NA
Prunus virginiana	70	70	70	69	99
Salix exigua	250	236	60	36	14
Total	685	661	458	105	

NA = Counts not available since plants had all grown together and it was no longer possible to distiguish the planted individuals. So individuals are very successful.

Note: The values in the percentage surviving column that are greater than 100% are due to the difficulty in determining which plants were the originally installed plants.

Clump Survival

1999 Planting	# Clumps Planted	2001 Clump Count	2002 Clump Count	2003 Clump Count	% Surviving
Symphoricarpos occidentalis	9	9	9	9	100
Rosa arkansana	11	10	11	11	100
Prunus virginiana	7	7	7	7	100
Salix exigua	56	53	40	38	68
Total	83	79	67	65	

2000 Planting	# Clumps Planted	2001 Clump Count	2002 Clump Count	2003 Clump Count	% Surviving
Symphoricarpos occidentalis	11	11	11	11	100
Rosa woodsii	10	10	10	10	100
Prunus virginiana	5	5	5	5	100
Salix exigua	50	50	20	16	32
Total	76	76	46	42	

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McKay Ditch Mitigation Planting Locations

Figure 1

LEGEND

- McKay Ditch Project Area
- 1999 Mitigation Planting
- 2000 Mitigation Planting

Standard Features

- Buildings
- Demolished Buildings
- Lakes & ponds
- Streams & ditches
- Fences
- Paved roads
- Dirt roads
- Contours (20 ft. intervals)

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas.
Digitized from the orthophotographs, 1/95.

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State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by: Professional Environmental Group, L.L.C.

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303-966-7707

MAP ID: 03-0001

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